site voltage is applied. This arrangement provides the latching mechanism for the device. The electrical current resulting from the drive voltages and the pulse duration is sufficient to force the cam out of its 'latched' position to the desired state without a constant voltage being applied to maintain the desired state.

By the inclusion of 'stops' in the body of the unit and the rotating cam, the two magnets are never perfectly aligned. This prevents the cam from being 'frozen' in an aligned position. The alignment of these 'stops' also limits the motion to less than 180 degrees. The arrangement of the two magnetic poles ensures that the cam is 'repelled' from one state to the other, it being considered that magnetic repulsion is more effective to operate the cam and its associated touch pin than is magnetic 'attraction'.

In a Braille application, each tactile display unit is preferably configured into a two-by-three matrix of these tactile display devices. By arranging these units into a matrix not unlike core memory or a computer keyboard, a series of these units can be addressed with a minimum of internal decoding and driver circuitry.

An ASCII character is translated into a six bit Braille representation and transmitted along the rows and columns of the matrix to the proper unit.

The application of the invention is presented in this disclosure primarily as a device for representing Braille characters. However, any touchable type of display that utilizes a matrix of pins to represent numbers, letters, or figures could gain a benefit from this device. Other possible applications include computer CRT repeaters, adding machine displays, electronic clocks, digital thermometers, elevator floor indicators and any other device that utilizes digital display technology. The ultimate goal of the invention is to provide a design that will result in the fabrication of a low-cost, low power device that employs a simple mechanism to display tactile data that ensures a long life span for each component.

Primary features of the invention, then, include its compact, durable, and simplified design utilizing a minimum of moving parts and commonly available materials. It is inexpensive to manufacture and maintain and is capable of achieving a long life span. Additionally, its modular design enables an end use to employ as many or as few tactile display devices or units as necessary.

Other and further features, objects, advantages, and benefits of the invention will become apparent from the following description taken in conjunction with the following drawings. It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory but not restrictive of the invention. The accompanying drawings, which are incorporated in and constitute a part of this invention, illustrate one embodiment of the invention and, together with the description, serve to explain the principles of the invention in general terms. Throughout the disclosure, like numerals refer to like parts.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a prospective view of a Braille reader utilizing a plurality of tactile display units embodying the present invention;

FIG. **2** is a prospective view of a tactile display unit embodying the invention;

FIGS. **3** and **4** are side elevation and top plan views, respectively, of the tactile display unit illustrated in FIG. **2**;

FIG. **5** is a cross section view taken generally along **5—5** in FIG. **4**;

FIGS. **6** and **7** are cross section views taken, respectively, along lines **6—6** and **7—7** in FIG. **5**;

FIG. **8** is an exploded perspective view, partially cut away and shown in section, illustrating one tactile display device of which there are several in a tactile display unit;

FIG. **9** is a cross section view taken generally along line **9—9** in FIG. **8**;

FIG. **10** is a cross section view taken generally along line **10—10** in FIG. **8**; and

FIGS. **11** and **12** are diagrammatic views generally illustrating the relationship between the electrical and mechanical systems of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Turn now to the drawings and initially to FIG. **1** which illustrates a console **20** which may, for example, be a Braille reader embodying the invention. A plurality of tactile display units **22** are embedded in an inclined upper surface **24** of the console **20**, so positioned that a blind person could readily read the information being presented at the same spacing as embossed Braille text. Each tactile display unit **22** is sized and shaped similar to a twelve pin DIP (dual in-line package) (see FIGS. **2** and **3**) and is both mechanically mounted on the console **20** and connected electrically to its internal electronic circuitry in a manner not unlike a conventional integrated circuit (IC). Data for display purposes on the console **20** are received from a host computer system (not shown) through an external interface **25**.

Turn now to FIGS. **4–7**, for a detailed description of the tactile display unit **22**. Each unit **22** which is configured for a Braille display includes a housing **26** formed with a plurality of cavities **28**, preferably cylindrical, generally arranged in two columns with three cavities per column. The central two cavities are slightly offset from the remaining or end cavities for a reason which will be explained subsequently. Central axes of the cavities **28** are substantially parallel and are substantially equally spaced.

As seen in FIG. **5**, a roof **30** is integral with the housing **26**, so positioned as to overlie all of the cavities **28**. The roof **30** defines a reference surface **32** which is preferably planar and has a plurality of apertures **34** suitably formed to enable communication between each cavity **28** and the reference surface **32**.

A generally U-shaped electromagnet **36** is fixed to the housing **26**, as best seen in FIG. **8**. It includes a central bight portion **38**, and a pair of upstanding legs **40** and **41**. The wall of the cavity **28** is formed with an elongated slot **42** which is generally parallel to the central axis of the cavity **28**. The leg **40** of the electromagnet **36** is fittingly received in the slot **42**. The slot is sufficiently deep that, when fully inserted, the bight **38** of the electromagnet **36** is spaced from an undersurface **44** of the housing **26**. This space permits fitting reception of a plug **46** which serves to seal the bottom of the cavity **28**. The outer surface of the plug **46** is substantially flush with the undersurface **44**. Electrical leads **48** and **50** (FIG. **5**) extend from opposite ends of the bight **38** through diametrically opposed openings **51** in the plug **46** and thereby define the legs **40**, **41** as being spaced